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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE PATENT APPLICATION OF: Wolfe Our File No. 211-01 US

SERIAL NUMBER: 10/712,016 **GROUP**: 3652

FILED: 11/14/2003 **EXAMINER**: Greenhut, Charles N

The Commissioner Of Patents And Trademarks,
Washington, D.C., 20231, U.S.A.

November 15, 2006

DECLARATION Under 37 CFR 1.132

Sir:

I, JUERGEN FUCHS, hold an M.Sc. in Mechanical Engineering from the University of Karlsruhe (Germany), 1986, and a Ph.D. in Mechanical Engineering, from the University of Karlsruhe (Germany), 1991. Between 1986 and 1994 I worked at the Institute for Fluid Dynamics conducting experimental and numerical investigations in the field of fluid dynamics as well as teaching undergraduate and graduate students. Between 1994 and 1996 I worked at the University of Tottori (Japan) as an Associate Professor conducting numerical investigations of rarefied gas phenomena and teaching classes in applied mathematics and physics to undergraduate and graduate students. I am a Senior Member of the American Institute of Aeronautics and Astronautics (AIAA).

I MAKE OATH AND SAY:

1. THAT I was given a copy of US Patent Application 10/712,016 in the name of Wolfe, US Patent 5,052,879 issued to Wolfe, and US Patent 4,573,854 issued to McFarland and asked to investigate the feasibility of employing a combination of the teachings of the Wolfe patent and McFarland for loading through a rear door opening of vehicles having a rear bumper.

2. THAT I reviewed the documents.

3. THAT US Patent Application 10/712,016 teaches an inside vehicle lift for transferring a load through a rear door opening of a vehicle having a rear bumper. As shown in Figs. 1a to 1d, a load platform 120 is horizontally movable between a loading position with the load platform being disposed behind the rear bumper of the vehicle and a transport position inside the vehicle. A base is attached inside the vehicle to a vehicle

floor such that a rear end of the base is located in proximity to the rear door opening. A lift unit comprises a lift support base 122 for supporting the load platform 120 when disposed outside the vehicle. The lift support base 122 is mechanically connected at a left hand side and at a right hand side to a left hand side lift actuator 126 and a right hand side lift actuator 126, respectively. The lift actuators 126 move vertically the lift support base 122 with the load platform 120 between a first vertical position with the load platform 120 being in close proximity to ground and a second vertical position suitable for horizontally moving the load platform 120 into the vehicle. A left hand side gear mechanism 130 and a right hand side gear mechanism 130 provide translational and rotational movement of the lift unit through the rear door opening of the vehicle between a first position inside the vehicle with the lift support base 122 being disposed in proximity to the rear door opening and oriented substantially vertical and a second position outside the vehicle with the lift support base 122 being disposed behind the rear bumper and oriented substantially horizontal.

4. THAT US Patent 5,052,879 teaches a wheelchair lift and transfer system for use with a vehicle, which is designed to enable a person in a wheelchair to independently enter a vehicle and drive from his/her wheelchair without leaving the wheelchair platform. As shown, for example, in Fig. 5, the wheelchair lift comprises two lift cylinders 5, which are - at an upper end thereof - pivotally movable attached to a door frame of the vehicle's body shell. Attached to piston rods 26 of the lift cylinders 5 is a lift frame 6 for supporting a lift platform 7 when disposed outside to vehicle. Attached to a lower end of each lift cylinder 5 is a horizontally oriented swing cylinder 14, which is, at an opposite end, pivotally movable attached to the vehicle floor. For loading, the lift cylinders 5 are swung out using the swing cylinders 14, while the piston rods 26 are hydraulically moved such that the lift frame 6 touches the ground 36, as shown in Fig. 11. The piston rods 26 are then hydraulically retracted until the lift frame 6 is level with the vehicle floor for transferring the lift platform 7 from the same to the vehicle floor.

5. THAT US Patent 4,573,854 teaches an apparatus for loading a wheelchair through the rear door opening of a vehicle. As shown in Figs. 1 to 4, a pair of motor-driven drive links 36 and a pair of drag links 38 are utilized to lift and rotate a chair rack 40, together with a collapsed wheelchair mounted thereon, into the vehicle's rear compartment. The drive links 36 and drag links 38 connect the rack 40 to carriage 30 which is rolled from a rearward position to a forward position for storage of the rack 40 and the collapsed wheelchair inside the rear compartment of the vehicle. The lengths of drive links 36 and the drag links 38 is adjustable to allow for variations in vehicles in which the apparatus is mounted but are of fixed length during operation.

6. THAT the teachings of US Patent 5,052,879 and US Patent 4,573,854 cannot be combined.

Firstly, it is impossible to modify the teachings of US Patent 5,052,879 with the pairs of drive links 36 and drag links 38 taught in US Patent 4,573,854 to move the lift platform 7 taught in US Patent 5,052,879 into a storage position. As is evident from Figs. 1 to 5, the lift platform 7 is always oriented substantially horizontally, i.e. during loading, lifting,

transferring into the vehicle, and storage inside the vehicle. On the other hand, the pairs of drive links 36 and drag links 38 taught in US Patent 4,573,854 only allow rotational movement dictated by the same, as shown in Figs. 1 to 4, with the rack 40 being oriented substantially vertical when disposed outside the vehicle and forming an acute angle with the horizontal when disposed inside the vehicle. The result is that a load experiences a substantial change of its orientation, not only during the loading process, but also a change of its orientation of approximately 80° between loading and storage, which is highly undesirable in almost all loading applications. Furthermore, in order to be able to clear the upper end of the rear door opening and the roof of the vehicle only relatively flat objects - such as a collapsed wheelchair - can be loaded, as is evident from Fig. 2.

Secondly, it is impossible to modify the teachings of US Patent 5,052,879 with the loading location of US Patent 4,573,854 for loading through a rear door opening of vehicles having a rear bumper.

To accommodate the wheelchair lift taught in US Patent 5,052,879 substantial modifications of the vehicle floor are necessary including lowering of the same, as can be easily seen in Fig. 5. On average, the distance between the lowered floor of the vehicle 21 and ground 36 is approximately 10'' to 12''. To be able to move the lift frame 6 from a transfer position - level with the vehicle floor - and a loading position - on ground - a lift having a stroke of approximately 15'' is needed. The preferred solution for such a lift is a single stage dual action hydraulic cylinder, which provides maximum lift while requiring minimum space. A hydraulic cylinder for accommodating a piston with a 15'' stroke has an approximate length of 20'' which is easily accommodated in the door opening. A major design objective when employing hydraulic cylinders is to keep torque acting at the connection between the hydraulic cylinder and the piston within specifications in order to ensure relative movement between the hydraulic cylinder and the piston when extending/retracting the same and to prevent leakage of hydraulic fluid. The torque is at a maximum at the time instance when the lift frame with the load is moved off the ground. At this time instance the hydraulic cylinder is swung out to a maximum angle of approximately 15° to the vertical and the piston is nearly fully extended. Assuming a combined weight - lift frame + lift platform + wheelchair with occupant - of 250 lb, the maximum torque due to the angular orientation of the hydraulic cylinder to the vertical is approximately 40 lb×ft per hydraulic cylinder, which allows employment of a hydraulic cylinder within its specifications.

I would not consider lowering the floor in the rear of a vehicle having a rear bumper in order to employ the wheelchair lift taught in US Patent 5,052,879 for loading through the rear door opening. Firstly, lowering of the floor in the rear of a passenger vehicle not only requires a major re-design of the floor section of the vehicle's body shell, but also a major re-design of the vehicle's rear axle together with its suspension, and likely a relocation of the vehicle's gasoline tank. These are major modifications to a vehicle which require an extensive approval process if the vehicle is to be used on public roads and are not warranted for installing a lift system. Secondly, it is impossible to employ the wheelchair lift taught in US Patent 5,052,879 in the rear of a rear-wheel driven or four-wheel driven vehicle because components of its rear axle powertrain such as driveshaft

and differential cannot be redesigned to allow lowering of the rear floor to be approximately 10'' to 12'' inches above ground.

I would not consider the teachings of US Patent 5,052,879 to design a lift system for transferring a load through an existing rear door opening and onto an existing rear floor of a vehicle having a rear bumper. According to the teachings of US Patent 5,052,879, the hydraulic cylinders 5 need to be pivotally movable mounted to the rear door opening frame structure of the vehicle's body shell - in close proximity to the roof in order to maximize the length available for the hydraulic cylinders 5 when disposed inside the vehicle. Affixing a lift system at this location is not an easy task. Firstly, in general the body shell of a vehicle is weaker at this location - upper portion of the rear door - than at the driver's door frame below the window level, and likely needs to be reinforced. Secondly, special care has to be taken not to interfere with the hinges and/or lift mechanism of the rear door. Thirdly, more recent models have a rear light assembly extending well into the upper portion of the rear of the vehicle, therefore, special care has to be taken not to interfere with the same.

Appended Fig. I illustrates the rear of a vehicle with a rear bumper and distances to be considered. Referring to the distances illustrated in appended Fig. I, average dimensions for various vehicle types with a rear bumper are as follows:

a) Minivans:

Distance 'A' between inside floor level in the rear and ground: 25''
Distance 'B' between inside floor level and inside roof in the rear: 38''
Distance 'C' between attachment point of hydraulic cylinder 5 and edge of rear bumper: 26''
Distance 'D' between attachment point of hydraulic cylinder 5 and ground (clearing the edge of the rear bumper): 76''

b) SUVs:

Distance 'A' between inside floor level in the rear and ground: 29''
Distance 'B' between inside floor level and inside roof in the rear: 35''
Distance 'C' between attachment point of hydraulic cylinder 5 and edge of rear bumper: 16''
Distance 'D' between attachment point of hydraulic cylinder 5 and ground (clearing the edge of the rear bumper): 73''

c) Full Size Vans:

Distance 'A' between inside floor level in the rear and ground: 28''
Distance 'B' between inside floor level and inside roof in the rear: 47''
Distance 'C' between attachment point of hydraulic cylinder 5 and edge of rear bumper: 18''
Distance 'D' between attachment point of hydraulic cylinder 5 and ground (clearing the edge of the rear bumper): 82''.

Comparing the distance 'D' with the distance 'B' shows that the lift requires a stroke of a minimum length of approximately 38'' for Minivans and SUVs, and 39''for Full Size Vans, while the maximum length available for the hydraulic cylinder when disposed inside the vehicle is approximately 38'' for Minivans, 35'' for SUVs, and 47''for Full Size Vans. A single stage lift such as a single hydraulic cylinder - piston assembly with a hydraulic cylinder of 38'' length provides a maximum stroke of approximately 34''. Therefore, in Minivans and SUVs it is necessary to employ a two stage lift such as a two stage dual action hydraulic lift, having a second dual action hydraulic cylinder - piston assembly nested inside a first dual action hydraulic cylinder - piston assembly. Two stage lifts such as two stage dual action hydraulic lifts have a substantially larger cross-section substantially reducing the width of a load that can be transferred therebetween, are substantially more complex, and are substantially more expensive than single stage lifts.

Let us now consider again the maximum torque acting at the connection between the hydraulic cylinder and the piston of the first stage. At the time instance of the maximum torque, the hydraulic cylinders 5 are swung out to a maximum angle of approximately 35° to the vertical for Minivans, 30° for SUVs, and 24° for Full Size Vans. Assuming again a combined weight of 250 lb, the maximum torque due to the angular orientation of the hydraulic cylinders 5 to the vertical is per hydraulic cylinder approximately 270 lb×ft for Minivans, 230 lb×ft for SUVs, and 157 lb×ft for Full Size Vans, i.e. 6.75 times larger for Minivans, 5.75 times larger for SUVs, and 4 times larger for Full Size Vans than the maximum torque above. Single stage lifts and, in particular, two stage lifts such as two stage dual action hydraulic lifts capable of accommodating such a maximum torque have a further increased cross-section resulting in a further decreased width of the load that can be transferred therebetween. Likely, the width will be decreased to the extent that the lift system is no longer useful.

Mounting the hydraulic cylinders 5 at location substantially below the one shown in Fig. I is no option. For example, mounting the hydraulic cylinders 5 at a location in the rear door opening at half the distance 'B' would allow to dispose a hydraulic lift having a maximum length of approximately 18'' for Minivans and 17'' for SUVs. In order to reach ground, the lift has to provide a stroke of approximately 37'' for Minivans and SUVs, which is only possible by using a three stage lift. Furthermore, the maximum torque acting at the connection between the hydraulic cylinder and the piston of the first stage remains approximately the same as above.

It is impossible to use the teachings of US Patent 5,052,879 to design a lift system for transferring a load through an existing rear opening and onto an existing rear floor of a pickup truck. Firstly, a pickup truck does not have a frame structure of the vehicle body shell such as a rear door opening for mounting the hydraulic cylinders 5. Secondly, the sides of a pickup truck bed at the rear are too weak and would need substantial reinforcement in order to be able to mount the hydraulic cylinders 5 thereon. Thirdly, at least a three stage lift such as a three stage dual action hydraulic lift would be required to provide the stroke sufficient necessary when mounted to the rear end of the sides of the pickup truck bed.

7. THAT the teachings of US Patent 5,052,879 and US Patent 4,573,854 when combined do not result in the inside vehicle lift taught in US Patent Application 10/712,016.

Firstly, as outlined above modifying the teachings of US Patent 5,052,879 with the pairs of drive links 36 and drag links 38 taught in US Patent 4,573,854 to move the lift platform 7 taught in US Patent 5,052,879 into a storage position would result in the load platform being oriented substantially vertical when disposed outside the vehicle and oriented at an acute angle to the horizontal when disposed inside the vehicle, NOT substantially horizontal when disposed outside and inside the vehicle as defined by the features of independent claims 1 and 15 of US Patent Application 10/712,016.

Secondly, modifying the teachings of US Patent 5,052,879 with the loading location of US Patent 4,573,854 for loading through a rear door opening of vehicles having a rear bumper would result in that in the loading position the lift actuators 126 are swung out forming an angle to the vertical of 24° to 35° resulting in a substantial torque acting on the lift, as described above. Therefore, the lift cylinders 5 are not oriented substantially vertical as are the lift actuators 126 defined by the features of independent claims 1 and 15 of US Patent Application 10/712,016. Furthermore, even when fully extended in the loading position the lift cylinders 5 are swung out such that between 51% and 67% of their length is located in front of the rear edge of the rear bumper. Therefore, the lift cylinders 5 are not disposed behind the rear bumper as are the lift actuators 126 defined by the features of independent claims 1 and 15 of US Patent Application 10/712,016.

8. THAT I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FURTHER AFFIANT SAYETH NOT.
SIGNED at Ottawa, Ontario, this 15th day of November, 2006.

SWORN before me at the city of)
Ottawa, Province of Ontario, this)
15th day of November, 2006.)

J. Fuchs
Juergen Fuchs, Ph.D. Mech. Eng.

A Commissioner for
the taking of oaths, etc.

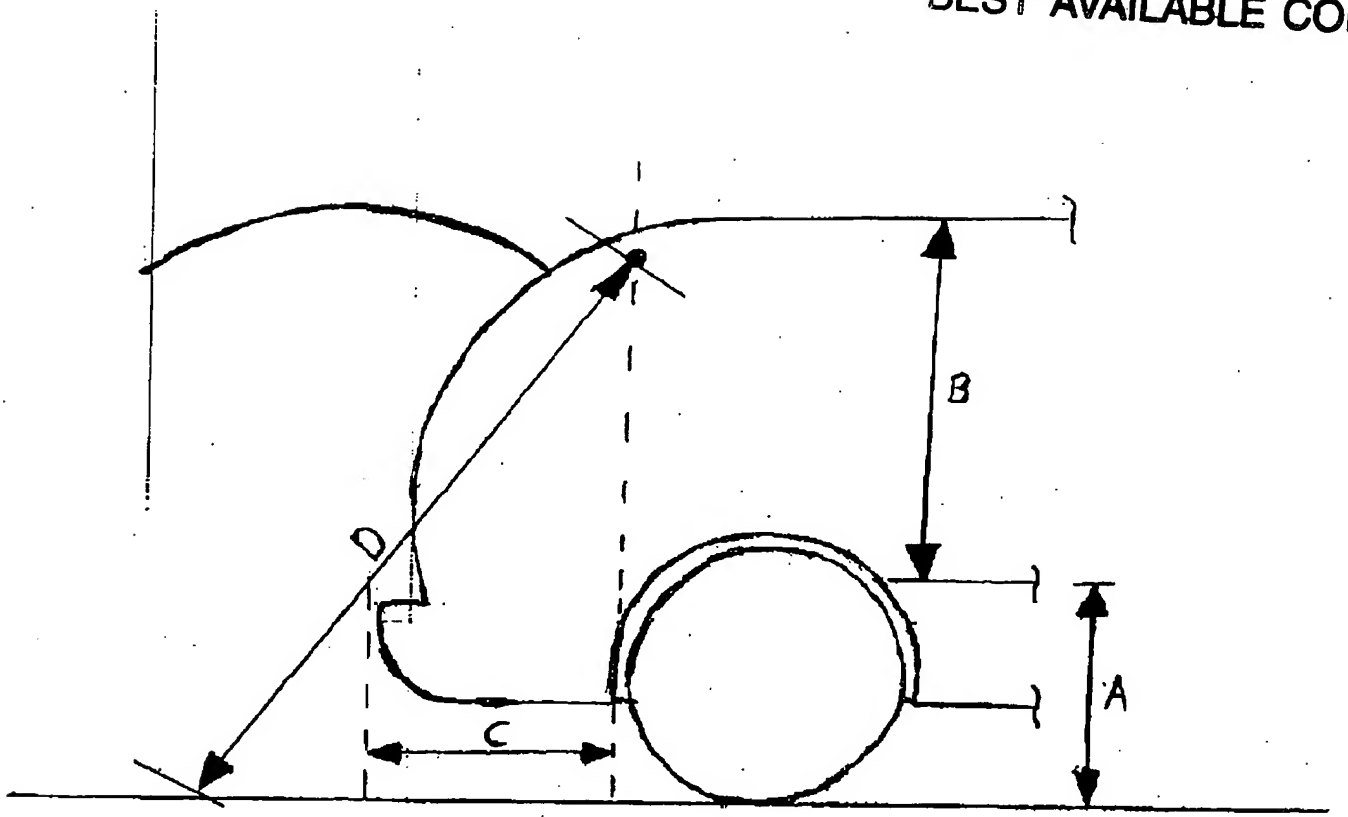

Fig. I